WHAT IS CLAIMED IS:

1. A process for capping an extremely low dielectric constant ("ELK") film using a silicon carbide type film comprising:

forming an ELK film on a substrate; and

depositing an amorphous silicon carbide capping layer on said ELK film.

2. The process of claim 1 wherein a combined dielectric constant of a stack consisting of said ELK film and said amorphous silicon carbide capping layer is lower than a combined dielectric constant of another stack consisting of said ELK film and a carbon-doped silicon oxide capping layer which has a dielectric constant less than the dielectric constant of the amorphous silicon carbide capping layer.

3. The process of claim 1 wherein said amorphous, hydrogenated silicon carbide capping layer has a dielectric constant of less than approximately 3.5.

4. The process of claim 1 wherein said amorphous silicon carbide capping layer is copper diffusion resistant.

5. The process of claim 1 wherein said amorphous silicon carbide capping layer does not adversely react with said ELK film to substantially degrade said ELK film's dielectric property.

6. The process of claim 1 wherein said amorphous silicon carbide capping layer has an adhesion strength to said ELK film of greater than 35 MPa.

7. The process of claim 1 wherein said amorphous silicon carbide capping layer permits no substantial penetration of moisture.

8. The process of claim 1 wherein a combined dielectric constant for a stack consisting of said ELK film and said silicon carbide capping layer to be less than 3.0.

9. The process of claim 8 wherein the combined dielectric constant is less than 2.5.

10. The process of claim 1 wherein said ELK film has a dielectric constant of approximately 3.0 or less.

11. The process of claim 10 wherein said ELK film has a dielectric constant of approximately 2.5 or less.

12. The process of claim 1 wherein said amorphous silicon carbide capping layer is an amorphous, hydrogenated silicon carbide layer deposited by:

introducing a silicon containing precursor, a carbon containing precursor, and a carrier gas into a chamber; and

applying energy to react said silicon containing precursor and said carbon containing precursor to deposit said amorphous, hydrogenated silicon carbide capping layer on said ELK film in a non-oxidizing environment.

13. The process of claim 12 wherein said silicon containing precursor comprises silane.

14. The process of claim 12 wherein said silicon containing precursor and carbon containing precursor are derived from a common organosilane precursor.

15. The process of claim 12 wherein said silicon carbide capping layer is deposited at a temperature of between approximately 100° to 450°C.

16. The process of claim 12 wherein applying energy comprises generating a plasma in said chamber.

17. The process of claim 1 further comprising depositing a carbon-doped oxide layer on said amorphous silicon carbide capping layer.

18. The process of claim 17 wherein said carbon-doped oxide layer is a carbon-doped silicon oxide layer formed by:

introducing a silicon containing precursor, a carbon containing precursor, and a process gas into a chamber, said process gas including oxygen; and

providing a plasma in said chamber to react said silicon containing precursor and said carbon containing precursor in the presence of said plasma to deposit said carbon-doped silicon oxide layer on said amorphous silicon carbide capping layer

19. The process of claim 18 wherein said oxygen is introduced at a rate to produce an oxygen-starved plasma for depositing said carbon-doped silicon oxide layer.

20. The process of claim 18 wherein said silicon containing precursor and carbon containing precursor are derived from a common organosilane precursor.

21. The process of claim 20 wherein said organosilane precursor is provided at a rate approximately six times that of the flow of oxygen gas.

22. A process for capping an extremely low dielectric constant ("ELK") film using a silicon carbide material comprising:

forming an ELK film on a substrate; and

depositing a silicon carbide capping layer having a dielectric constant of approximately less than 5 on said ELK film, where said silicon-carbide layer is produced by a process providing a silicon containing precursor, a carbon containing precursor and process gases comprising oxygen, helium and nitrogen at rates of 0-400 sccm, 0-5000 sccm, and 0-5000 sccm respectively for the process gases, and providing said silicon containing precursor and said carbon containing precursor at a rate approximately six times that of the oxygen and further comprising reacting said silicon and said carbon in a chamber having a pressure in the range of about 1 to 15 Torr with an RF power source supplying a power at approximately 300-600 watts and a substrate surface temperature between approximately 100° and approximately 450° C and having a shower head to substrate spacing of approximately 200 to approximately 600 mils, and wherein said capping layer has an adhesion strength of at least about 35 MPa to said ELK film, and wherein the dielectric constant of the for a stack consisting of said ELK film and said silicon carbide layer is at most approximately 3.0.

23. A stack having a capped extremely low dielectric constant ("ELK") layer, comprising:

a substrate;

an ELK layer formed on said substrate;

an amorphous silicon carbide layer deposited on said ELK layer; and

a carbon-doped oxide layer deposited on said amorphous silicon carbide layer.

24. The stack of claim 23 wherein said amorphous silicon carbide layer is an amorphous, hydrogenated silicon carbide layer having less than about 5 atomic % oxygen.

25. The stack of claim 24 wherein said amorphous, hydrogenated silicon carbide layer has substantially no oxygen.

26. The stack of claim 23 wherein said amorphous silicon carbide layer is deposited from a silicon-containing and carbon-containing precursor in a non-oxidizing environment.

27. The stack of claim 23 wherein said carbon-doped oxide layer is a carbon-doped silicon oxide layer.

28. The stack of claim 23 wherein said carbon-doped oxide layer comprises about 30-50 atomic % oxygen.

29. The stack of claim 23 wherein said carbon-doped oxide layer comprises about 10-30 atomic % carbon.

30. The stack of claim 23 wherein said amorphous silicon carbide layer has an effective dielectric constant of approximately less than 5.

31. The stack of claim 23 wherein said carbon doped oxide layer has an effective dielectric constant of approximately less than 3.5.

32. The stack of claim 23 wherein said stack has a combined dielectric constant of approximately less than 3.

33. The stack of claim 32 wherein said stack has a combined dielectric constant of approximately less than 2.5.

34. The stack of claim 23 wherein said amorphous silicon carbide layer comprises an etch selectivity ratio of between about 40 to 1 and about 1 to 1.

35. The stack of claim 23 wherein said amorphous silicon carbide layer has an adhesion strength to said ELK layer of at least about 35 MPa.

36. The stack of claim 23 wherein said amorphous silicon carbide layer is a moisture resistant layer.

37. The stack of claim 23 wherein said carbon-doped oxide layer is produced by a process providing a silicon containing precursor, a carbon containing precursor and process gases comprising oxygen, helium and nitrogen at rates of 0-400 sccm, 0-5000 sccm, and 0-5000 sccm respectively for the process gases, and providing said silicon

containing precursor and said carbon containing precursor at rate approximately six times that of the oxygen and further comprising reacting said silicon and said carbon in a chamber having pressure in the range of about 1 to 15 Torr with an RF power source supplying a power at a rate of approximately 300-600 watts and a substrate surface temperature between approximately 100° and approximately 450° C and having a shower head to substrate spacing of approximately 200 to approximately 600 mils.

38. The stack of claim 23 wherein said carbon-doped oxide layer is produced in an oxygen-starved plasma.